

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-179586

(43)Date of publication of application : 07.07.1998

(51)Int.Cl.

A61B 8/00
G06F 19/00

(21)Application number : 09-336591

(71)Applicant : ATL ULTRASOUND INC

(22)Date of filing : 21.11.1997

(72)Inventor : WOOD MICHAEL A
RONCALEZ PASCAL
CANFIELD EARL M II
DLAC KYMBERLY VAN
DEWAR IAN
DAVID N ROUNDHILL
UNGARI JOSEPH L

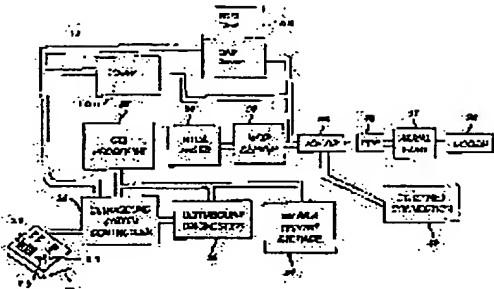
(30)Priority

Priority number : 96 31591 Priority date : 21.11.1996 Priority country : US

(54) MEDICAL ULTRASONOGRAPH

(57)Abstract:

PROBLEM TO BE SOLVED: To enable a user of a remote place to get access to information by incorporating a browser into an ultrasonic device.
SOLUTION: A browser 100 by which a user of an ultrasonic device 10 can communicate with the other site through a hypertext link, is incorporated into the ultrasonic wave 10. The browser 100 contains software to enable an operator look at a hypertext document which exists in a remote place from the ultrasonic device 10 or is preserved in a server 30 on the ultrasonic device 10 itself. This browser 100 is connected to an ultrasonic device controller 18, and is made to perform mutual work with an ultrasonic device storage medium 24 and a display device. It is made operable by a user interface of the ultrasonic device 10. A hypertext link of a displayed HTML page is 'clicked', and a browser display is operated by a keyboard 22 or a track board 26, and desired information is selected by a selecting key 27. In this way, the information can be obtained in a remote place.



LEGAL STATUS

[Date of request for examination] 19.11.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than

*** NOTICES ***

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS**[Claim(s)]**

[Claim 1] It consists of browser software; which creates and saves a diagnostic-ultrasound image or a diagnostic report and which is a medical diagnostic ultrasonic device and was installed in this ultrasonic device, and a means to connect this browser software with the external database of this ultrasonic device, this is well-informed about the image or information saved outside in this browser software, and it is this accessible medical diagnostic ultrasonic device from a remote place.

[Claim 2] The medical diagnostic ultrasonic device of claim 1 with which this browser software consists of a means to see hyper-text data.

[Claim 3] The medical diagnostic ultrasonic device of claim 1 with which this connecting means consists of a means to connect this browser software to a network.

[Claim 4] The medical diagnostic ultrasonic device of claim 3 with which a means to connect this browser software with a network consists of TCP/IP software further.

[Claim 5] The medical diagnostic ultrasonic device of claim 4 with which a means to connect this browser software with a network consists of PPP software further.

[Claim 6] The medical diagnostic ultrasonic device of claim 5 with which a means to connect this browser software with a network consists of a modem further.

[Claim 7] The medical diagnostic ultrasonic device of claim 1 with which this ultrasonic device consists of a user interface which controls actuation of this ultrasonic device further, and this browser software is also operated by this user interface here.

[Claim 8] The medical diagnostic ultrasonic device of claim 7 with which this user interface has image display.

[Claim 9] The medical diagnostic ultrasonic device of claim 7 with which this user interface has a keyboard.

[Claim 10] The medical diagnostic ultrasonic device of claim 7 with which this user interface contains a trackball.

[Claim 11] Furthermore, it consists of a means to connect this browser software with the information source of the reference image of the exterior of this ultrasonic device, this leads browser software to the reference image saved outside from a remote place, and it is the medical diagnostic ultrasonic device of accessible claim 1.

[Claim 12] The medical diagnostic ultrasonic device of claim 11 with which this browser software consists of a means to see hyper-text data.

[Claim 13] The medical diagnostic ultrasonic device of claim 11 with which a means to connect consists of a means to connect this browser software to a network.

[Claim 14] The medical diagnostic ultrasonic device of claim 13 with which a means to connect this browser software to a network consists of a modem further.

[Claim 15] The medical diagnostic ultrasonic device of claim 11 with which it consists of a means to display a reference image on the this display which adjoined; and the ultrasonic image further created by the ultrasonic device, including the display with which this ultrasonic device displays further the

ultrasonic image created by the ultrasonic device.

[Claim 16] Furthermore, the medical diagnostic ultrasonic device of claim 1 which connects with electronic message software; installed in this ultrasonic device, and this electronic message software, and becomes the information source of the exterior of this ultrasonic device from delivery and a means to receive an electronic message from this information source, about an electronic message.

[Claim 17] The medical diagnostic ultrasonic device of claim 16 with which it consists of a means to connect this electronic message software to a network, and this ultrasonic device can transmit by this and receive an electronic message through this network.

[Claim 18] The medical diagnostic ultrasonic device of claim 17 with which a means to connect this electronic message software to a network consists of TCP/IP software further.

[Claim 19] The medical diagnostic ultrasonic device of claim 18 with which a means to connect this electronic message software to a network consists of PPP software further.

[Claim 20] The medical diagnostic ultrasonic device of claim 19 with which a means to connect this electronic message software to a network consists of a modem further.

[Claim 21] The medical diagnostic ultrasonic device of claim 20 with which this ultrasonic device consists of a user interface which controls actuation of this ultrasonic device further, and this electronic message software is also operated by this user interface here.

[Claim 22] The medical diagnostic ultrasonic device of claim 21 with which this user interface has image display.

[Claim 23] The medical diagnostic ultrasonic device of claim 21 with which this user interface contains a keyboard.

[Claim 24] The medical diagnostic ultrasonic device of claim 21 with which this user interface contains a trackball.

[Claim 25] Are the medical diagnostic ultrasonic device which creates and saves a diagnostic supersonic-wave image or a diagnostic report, and it connects as some :this ultrasonic devices. The store which saves this ultrasonic image or a report; in order to access browser software; installed in this ultrasonic device, and the information saved at this store A means to connect with this browser software; this leads this browser software to the image or report saved at this store, and it is an accessible medical diagnostic ultrasonic device.

[Claim 26] The medical diagnostic ultrasonic device of claim 25 with which a means to connect with this browser software consists of a server.

[Claim 27] The medical diagnostic ultrasonic device of claim 25 with which this browser software consists of a means to see this ultrasonic image or a report through a hypertext link.

[Claim 28] The medical diagnostic ultrasonic device of claim 25 with which this storage consists of an ultrasonic image memory.

[Claim 29] In order that this ultrasonic device may access further the ultrasonic image or report which this browser saved here at this storage including the user interface for actuation of this ultrasonic device, this user interface is led, and it is the medical diagnostic ultrasonic device of operational claim 25.

[Claim 30] It consists of browser software; which creates and saves a diagnostic supersonic-wave image or a diagnostic report and which is a medical diagnostic ultrasonic device and was installed in :this ultrasonic device, and a means to connect this browser software to the Internet, the image or information saved here outside leads the Internet, and it is an accessible medical diagnostic ultrasonic device from a remote place by this browser software.

[Claim 31] This browser software has the World Wide Web and compatibility of the Internet, the image or information saved here outside leads the World Wide Web of the Internet, and it is the medical diagnostic ultrasonic device of accessible claim 30 from a remote place by this browser software.

[Claim 32] The medical diagnostic ultrasonic device of claim 30 with which this browser software consists of a means to see hyper-text data.

[Claim 33] The medical diagnostic ultrasonic device [claim 34] of claim 30 with which a means to connect consists of a means to connect this browser software to a network The medical diagnostic ultrasonic device of claim 33 with which a means to connect this browser software with a network

consists of TCP/IP software further.

[Claim 35] The medical diagnostic ultrasonic device of claim 33 with which a means to connect this browser software to a network consists of PPP software further.

[Claim 36] The medical diagnostic ultrasonic device of claim 33 with which a means to connect this browser software to a network consists of a modem further.

[Claim 37] The medical diagnostic ultrasonic device of claim 30 with which this ultrasonic device has the user interface which controls actuation of this ultrasonic device further, and this browser software is also operated by this user interface here.

[Translation done.]

*** NOTICES ***

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the ultrasonic diagnosis image processing system which has a data access and communication capability. Moreover, this invention equipment is related with amelioration of the data from other ultrasonic devices and information sources, an image, a message, and a ultrasonic diagnosis image processing system accessible to the information on other classes. this invention -- a part of United States patent [application serial number 08 / September 25, 1996 [719,360 or] application] -- it is continuation application.

[0002]

[Description of the Prior Art] An United States patent [the application serial numbers 08/719,360] transmits an ultrasonic image and a report through World Wide Web, and the ultrasonic diagnosis image processing system which has the HTTP server which makes it possible to access an ultrasonic device is indicated, and a medical practitioner makes it substantial to examine the diagnostic result which the ultrasonic device saves in the world possible also from what computer terminal. "Length" The capacity to access this ultrasonic device and to search information and an image takes out a characterization eclipse from there, and a medical practitioner takes out the information on an ultrasonic device from a remote place as a "length (pull)" technique. This accomplishes "push (push)" technique of an advanced-technology supersonic-wave network, and good contrast, and what information "is pushed for" on a network or a frame extraction person positively from an ultrasonic device before information is disseminated to the ultrasonic device exterior, or before being used is required of an ultrasonic device operator there.

[0003]

[Problem(s) to be Solved by the Invention] It is desirable for an ultrasonic device operator to access the information on a remote place from an ultrasonic device in addition to enabling the user of a remote place to access information, to offer the capacity "lengthens" this information to an ultrasonic device, and to assist an ultrasonic examination. For example, a medical practitioner may be uncertain about the symptom on the pathology in the scanned ultrasonic image. Probably, at this time, the medical practitioner wants to compare the acquired image with the image of a well-known pathology symptom. This becomes easy by making it possible to call an image to refer to from the library of the image of the pathology condition that a medical practitioner is well-known. Probably, such a library exists in the regional network by which the ultrasonic device is connected to ultrasonic device itself, or the remote place.

[0004] As other examples, an ultrasonic device operator may have the group of the presetting of specific equipment to use for a specific inspection. A setup of an ultrasonic device is initialized for the inspection, or, as for such presetting, obstetric measurement etc. performs beforehand regular inspection. The operator may have saved them with other ultrasonic devices at network storage before, using presetting. It is desirable that it can call to inspection which carries them out after this so that an operator can perform the presetting automatically from other ultrasonic devices or preservation locations.

[0005] Moreover, it has a desirable ultrasonic device operator for other direct medical practitioners and a location, and a communication link to be also possible. For example, the ultrasonographer who inspected the patient will call the medical practitioner who is diagnosing, and will recheck the just acquired ultrasonic image, and will think that he wants to draw a diagnosis. For ultrasonographer, probably a medical practitioner will be called from an ultrasonic device and it will be convenient for a medical practitioner's office in a message delivery or that a medical practitioner can be immediately contacted in somewhere in hospitals.

[0006] Probably, it will be desirable that it is also the direct ready-for-sending ability from an ultrasonic device for an ultrasonic device operator about the image or diagnostic report acquired to the medical practitioner of other locations. For example, thereby, from the image on an ultrasonic device, and a report, the medical practitioner who is diagnosing can draw a diagnosis immediately, and can tell the medical practitioner who wants to consult about this diagnosis and the image which supports it, and a report directly, and can make urgent attention pay [rather than] to a sick patient.

[0007] It is also desirable to provide an ultrasonic device operator with the immediate access to an ultrasonic device and the newest information about the capacity. An operator accesses immediately the newest actuation information which enables activation of the highest ultrasonic examination also in the conditions on an ultrasonic probe, a monitor configuration, and what kind of pathology. Also when a notice and a report of such information can be sent to a direct ultrasonic device and it is not made to it for a manufacturer, an operator needs to acquire such information quickly.

[0008] It is still more desirable to an ultrasonic device operator that direct access can be carried out to the various information on the database of other area of a hospital. The information about the medical practitioner and patient who exist in the information system of a hospital carries out direct access from an ultrasonic device. Also for the information system of a hospital, direct information is acquired from an ultrasonic device, and it is necessary to acquire the information about use of an ultrasonic device or patient record, and the information for chart creation.

[0009]

[Means for Solving the Problem] According to this invention, a ultrasonic diagnosis image processing system is provided with the above-mentioned capacity by inclusion of the browser to an ultrasonic device. A browser is software which enables an ultrasonic device operator to see a hypertext document. Such a hypertext document can exist on ultrasonic device itself, or can come to hand in other locations. An ultrasonic device operator can use a browser, in order to pull out the information on an ultrasonic image and others from these locations to an ultrasonic device. This enables him for an operator to access equipment or the reference diagnostic image of other locations, and to access other equipments or the data on a network, such as data of a patient or a medical practitioner saved at the HIS. A browser can access a manufacturer's the newest notice and diagnostic information, and can also be used for reading electronically equipment information, such as device operation or a service manual, carefully again. An operator can search the presetting for a specific inspection from other ultrasonic devices or preservation locations by the browser.

[0010] As for the contents of the drawing, drawing 1 explains the ultrasonic diagnosis image processing system which has a browser by this invention in a block diagram format. Drawing 2 explains to the library of a reference image and the HIS the network which makes an ultrasonic device accessible. Drawing 3 explains the interaction of the browser in which an image processing is possible, and the control equipment of a ultrasonic diagnosis image processing system in a block diagram format.

[0011]

[The mode of implementation of invention] The ultrasonic diagnosis image processing system 10 of this invention is shown in drawing 1 and 3. An ultrasonic device 10 sends a supersonic wave to a patient's inside of the body, the echo which returns from a dispatch wave, an organ in the living body, and an interaction with an organization is received, and the well-known component of a large number containing the scan head 14 which has the ultrasonic transducer 12 which changes a reception echo into an electric echo signal is contained. An electric echo signal is suitably delayed with the beam formation vessel 16, and it is combined and it forms the coherent beam of echo information. The beam of echo

information is processed by the signal processor 64 according to the mold of the diagnostic information (for example, an B mode, Doppler, dye bleeding, etc.) which it is going to obtain. By transmitting the processed echo information to the display processor 68, and forming an ultrasonic image, it is saved at an image and the report storage 24, and it is displayed on a display 70, or the both are made.

[0012] Actuation of an ultrasonic device 10 is under management of a control panel 20, and an operator interacts control instruction with delivery or the ultrasonic device controller 18 with this control panel. A controller with many controllable users, such as a keyboard 22, a trackball 26, and the selection key 27, is usually contained in a control panel 20. Control of the control panel (according to the time, called a "softkey") with which an operator can interact is called a user interface with a video presentation controller. An operator operates a user interface, uses the report creation software package usually saved in the ultrasonic device or the attached diagnostic module, and also creates the diagnostic report of the carried-out ultrasonic examination. A diagnostic report is displayed, is printed by the printer (not displayed on drawing), and is saved at an image and the report storage 24.

[0013] An ultrasonic device 10 has the HyperText Transfer Protocol (HTTP) server 30. The HTTP server 30 connects and accesses an ultrasonic image and a report from a storage 24, and enables the personal computer, terminal, or workstation of a remote place to access the image of equipment, and a report. In drawing 1 , it connects with a modem 32 and a server 30 accesses the exterior or a local communication network. A server 30 makes diagnostic information of an ultrasonic device 10 usable at the user who connects and accesses an ultrasonic device through communication networks, such as a network shown in drawing 2 .

[0014] A server 30 is connected to a modem 32 through a serial port 31. A modem 32 changes the continuation digital data from a serial port 31 into the analog signal which suits the communication link by the telephone line. A modem changes the inputted analog telephone signal into digital data again, and passes a serial port 31, and an ultrasonic device makes it usable. The suitable modem is available from the Hayes microcomputer products shrine (Hayes MicrocomputerProducts, Inc.) which established the specification currently used by many modem manufacturers.

[0015] The communication link by the modem 32 is established by the software known as PPP (point-to-point (point-to-point) protocol) software as shown with the block 48 of a drawing. PPP is specification which makes many network protocols usable through a modem circuit or other serial connection. Other specification [CSLIP / which is the special mold of SLIP (Serial Line Internet Protocol) or SLIP which is the specification which makes usable the communications protocol known as TCP/IP (it discusses below) by one modem circuit or other serial connection] (compression Serial Line Internet Protocol) of other specification is usable. After PPP software is installed in an ultrasonic device, it must be initialized or set to the ultrasonic device with which it is operated, and modems. Setting information controls PPP software to suit the property of the telephone number of the mold of the serial port used and the modem used, the telephone line, and a host and the dial approach, a log in procedure, a password, etc. Generally, setting information carries out a setup about network connection initiation, such as when connection is started and what after connection is established, happens. PPP software is contained in some operating system software packages for the IBM compatible personal computers, such as Windows 95 of Microsoft Corp. of Washington and Redmond (Microsoft Corporation of Redmond, Washington). The PPP software for the Apple Computer personal computers is especially available from Virginia and the INTAKON system corporation (InterCon Systems Corporation of Herndon, Virginia) of Herndon.

[0016] The communication link by PPP software is a network protocol called a TCP/IP Internet protocol suite (Suite). TCP/IP is named from the Internet Protocol (IP) and the communications control protocol (TCP) which are two protocols used most widely. IP protocol controls the path (routing) of data, and a TCP protocol controls a data transfer. TCP/IP offers the common means of connection which led the packet transfer device known as the gateway. The gateway is the internetworking computer of the dedication which determines the path of the packet of an epilogue and the data between them for 2 or the network beyond it.

[0017] When there are data which the ultrasonic device considers want to transmit through the Internet

or other networks, these data are moved to TCP/IP shown with the block 46 of drawing. TCP clarifies a destination, checks it and encapsulates data to the segment called the TCP packet which has the header information used for rearranging a data segment into suitable sequence. Since a data block is sent through the Internet as each packet, each packet can give the path which changes with gateways, it is order with the suitable packet, or any guarantees cannot be found in arriving without an error at the destination. A TCP packet offers a means to guarantee packet delivery, coordination, and sequence arrangement. At a reception place, as for a packet, an error is checked according to TCP packet header information, an error-less segment is received, and these packets are rearranged and are reconfigured by the block at the time of data dispatch. A transmitting person leaves record of segment receipt, and when the segment is not received on time, a transmitting person broadcasts a packet again. When a segment is lost in the first dispatch or it is not received exactly, until, as for TCP, all segments are received at a reception place -- a receiving segment -- holding -- a degree -- them -- the relocation to the block at the time of transmission of data -- those -- suitable -- it ** and is rearranged into perfect sequence.

[0018] At a transmission place, a TCP packet is sent to IP and it makes a segment the form of an IP packet or datagram (datagram). Datagram has IP header which offers the addressing information used by the gateway and which determines the path of the datagram to the suitable destination. IP header has the Internet address of a transmission place and a reception place, and enables an addressee that the gateway ships data on the suitable root, and to check receipt of datagram. Although IP is tried so that it may do its best to send all datagram, it does not guarantee those attainment. The guarantee of delivery is offered by TCP through receipt acknowledgement and retransmission of message as mentioned above.

[0019] TCP/IP needs to be constituted by a specific ultrasonic device and its specific object for environments like PPP software. The information about the mold of the regional network by which the network in an area of the ultrasonic device (for example, Ethernet or a token-sharing network) is carried out to other ultrasonic devices at the typical configuration information of TCP/IP if it becomes, and the information about the address of other equipments on a regional network -- equipment is performing a router function -- if it becomes, there are the address of the server of the gateway address, the user name of an ultrasonic device and the password for access, and an ultrasonic device, the Internet address (IP address) of an ultrasonic device, and a default domain of a regional network. The available thing for Apple Computer from INTAKON of TCP/IP software as well as PPP is available with some system software packages, such as Windows 95.

[0020] In drawing 1, TCP/IP is connected to the Ethernet connection 50 in regional network media and this example. The Ethernet connection 50 connects an ultrasonic device with other equipments on a regional network. The linear bus by the carrier sensing multi-access which has carrier sense multiple access with collision detection (CSMA/CD) is used for a traditional Ethernet network. It is often described by the same specification which uses the mutual frame mode based on IEEE802.3. The Ethernet connection 50 is applicable to access to a local area network (LANs), a Wide Area Network (WANs), IEEE802.5 token ring, and other networking infrastructure structures. Data can communicate in an Ethernet (being former thing per second 10-megabit and the latest edition per second a maximum of 100 megabits) network at high speed, and each equipment is allowed a communication link only while other equipments are not sending through a system.

[0021] The HTTP server 30 interacts with the network software of TCP/IP and PPP. A HTTP server is a software program used for a communication link for a web browser to access information from an ultrasonic device. A HTTP server -- the web page of additions, such as web page information, an ultrasonic image, and a report, and the hypertext connection with information -- displaying -- the interior or the exterior -- it answers for asking. A HTTP server -- moreover, it is further indicated by original application at a detail -- as -- the exterior -- it answers for asking and a specific activity is carried out in relation to the carbon button or controller on an ultrasonic device.

[0022] Answering an external demand, the HTTP server 30 sends the HyperText-Markup-Language (HTML) page 34 to a demand place web browser. A HTML page describes a carbon button, a text, an image, the animation-ized real-time loop formation, sound, and what [other] a web browser displays on

the screen of a remote terminal. A HTML page can be directly encoded by software according to the directions released to many reference reference, such as the "release HTML and CGI" (HTML and CGI Unleashed, by John December and Mark Ginsburg, published by Sams.net Publishing, Indianapolis, Indiana.) etc. of John DISSEMBA released by Sams network publication of Indiana and Indianapolis, and the Mark Ginsberg work. It can create commercially using available desktop publishing and word-processing software, and can encode in a HTML format using the software known as an Internet assistant next, or the same software as a function top, and an easy HTML page can download the above-mentioned software through the homepage of Microsoft WWW.microsoft.com. By hope, the public domain software known as a web manufacturer (Webmaker) can be downloaded from the Internet, and it can be used for creation of a web page. A web page has the HTML tag of the data which indicate how a page should be interpreted by the web browser. The link to an ultrasonic image file is given with the IMG tag in a web page code. Referring to the HREF hypertext offers the link means to the web page of other ones on the link means to other web pages or network of the same ultrasonic device, or a web of host devices. Once a HTML page is created, they will be copied to an ultrasonic device and a HTTP server will be provided with those preservation addresses. When requiring that a remote terminal or a browser should look at the specific web page of an ultrasonic device, the HTTP server 30 always takes the responsibility of returning the contents for this page to a header and a claimant.

[0023] The small executable program of a large number called the common gateway interface (CGI) program shown in 36 is contained in an ultrasonic device 10. A CGI program offers the interface between the hardware of a HTML page and an ultrasonic device, and software. A CGI program is searched for so that the information which communicates with an ultrasonic device, and urges an activity to equipment, or is demanded [condition / an image, a report, or / current] may be offered. In the example of a configuration, a CGI program runs on information requirements by creating dynamically the of-special-make HTML page where the demanded information was embedded. Original application is performed corresponding to the CGI program and input argument (argument) which offer the display of an ultrasonic image and the patient directory of a report, and the selected ultrasonic image, carries out an equipment diagnosis, and explains actuation of a general purpose program of providing many ultrasonic devices on a network with a patient directory. In the example of a configuration, a CGI program is saved at the hard disk of the ultrasonic device of the directory named "cgi-bin." A CGI program accesses the ultrasonic image and report which are saved 24, although those actuation is performed, is accessed at the diagnostic routine saved 28, is performed, and it does a joint activity with the controller of an ultrasonic device through the ultrasonic device controller 18.

[0024] A small program fragment is embedded in a server code by hope, and is performed based on CGI processing. According to this invention, an ultrasonic device 10 contains the browser 100 in which the communication link which goes via a hypertext link with other sites (other ultrasonic devices, servers, terminals, etc.) with interested information is possible for an ultrasonic device user. The software which makes possible what an ultrasonic device operator looks at the hypertext document (HTML page) saved from an ultrasonic device at a remote place or the server on the ultrasonic device itself for is contained in a browser 100. It connects with the ultrasonic device controller 18, and a browser 100 does a mutual activity with an ultrasonic device storage and a display, and it is operational by the user interface of an ultrasonic device. By "clicking" the hypertext link of the displayed HTML page, a user is the key or trackball 26 of a keyboard 22, and operates the cursor of a browser display, and the information for which it wishes by the input key or the selection key 27 of a keyboard next is chosen. Browser software, such as the available Internet Explorer browser, enables an ultrasonic device operator easily to acquire the information on an image, a report, and others through the World Wide Web of a regional network or the Internet from an available thing or Microsoft Corp. from California and Netscape Communications Corporation of Mountain View.

[0025] The further viewpoint of this invention is that the easy e-mail communications protocol (SMTP) server 102 is contained in an ultrasonic device 10. An electronic message is transmitted [SMTP server 102] and received by TCP/IP46 via a regional network or the Internet through network connections, such as the Ethernet connection 50 or a modem 32. It connects with the ultrasonic device controller 18,

and an SMTP server interacts with an ultrasonic device storage, a user interface, and a display. Software programs, such as a Eudora electronic communications program (Eudora electronic messaging program) containing the POP3 client protocol for electronic message reception and SMTP for dispatch, are employable with the POP3 client used in order to ask host equipment about the existence of a received message periodically. When a message is received by the ultrasonic device 10, SMTP server 102 displays a notice for an electronic message on a display 70 via reception and the device control machine 18. A message can be accessed through the user interface which used the keyboard 22, the trackball 26, or the selection key 27 next, and it is displayed on a display 70.

[0026] Generally, when other equipments function as a host system (POP host) of transmission and reception of a message, a POP3 client is used and full SMTP server mounting (implementation) is used for eternal Ethernet connection. The exchange of a message can be performed also by the HTTP server 30, and can send a message to other locations with a HTML page and a HTTP protocol. The electronic message transceiver capacity offered by SMTP server 102 is useful for the ultrasonic device operator from various fields. An electronic message can also attach whether it saves at an ultrasonic device for dispatch to the persons concerned and the becoming information, such as all information on the others which exist on alumnus chart as which an ultrasonic image, a report (or each count), an ultrasonic image loop formation, the presetting of equipment, and a user entered or a formula, equipment error record, or an ultrasonic device. Similarly, an operator can receive such information from other locations, and can use it with an ultrasonic device.

[0027] The capacity to send an electronic message from an ultrasonic device makes it possible to acquire information from other persons quickly and easily to an operator. The medical practitioner of other locations gives notes and critical information which serve as a guide of delivery and an ultrasonic examination in the message related to a future inspection performed on equipment to an ultrasonic device. It makes it possible to carry out the same inspection with the ultrasonic device of other locations automatically without the need of setting up a device manually so that inspection by which delivery or capacity to search was carried out in the presetting of the equipment of given inspection in other locations may be carried out again. Though the ultrasonographer who uses many ultrasonic devices of various locations can save him or her desirable equipment presetting at the file of an ultrasonic device or a Network Server, and they can be quoted in an electronic message, it can refer to from a HTML page and ultrasonographer will perform an ultrasonic examination suddenly where on that day, it can be searched and used through the Internet or a network. A browser can be used for downloading a new user setup ******(ed) again from an equipment manufacturer, and a user can exchange monitor configurations by sending an electronic message. Similarly, it specialized or alumnus table designed for desirable alumnus table, specific culture, or a country can download a suitable diagnostic instrument from a remote place.

[0028] Drawing 3 explains a detail to the pan of actuation of such capacity. It is compiled in software code and it leads the received equipment presetting data to the suitable preservation area of an ultrasonic device, it is used by the ultrasonic device controller and a browser 120 controls the function of equipment by this example. When an operator uses a browser and accesses equipment presetting data from other ultrasonic devices or data storage, an operation (steering) code leads receiving set presetting data to scan parameter preservation equipment 82, and is saved as special order (custom) presetting data there. By hope, an operator can download direct special order presetting data to scan parameter preservation equipment 82 using file transfer protocol FTP. An operator operates a user controller and an operator chooses this special order presetting data (often called an "organization detail image-processing (Tissue Specific Imaging)" (trademark) setup) saved at the ultrasonic device instead of a standard set updater at the beginning of an image processing, when the option of a monitor configuration parameter is granted. The ultrasonic device controller 18 initializes an ultrasonic device next, and according to an operator's special order equipment presetting, it carries out a supersonic scan so that it may be shown by connection between the ultrasonic device controller 18, the beam formation machine 16 of an ultrasonic device, a signal processor 64, and the display processor 68.

[0029] It is assumed that an operator wants to use the pregnancy age table designed specially because of

specific country people instead of the pregnancy age table installed in the ultrasonic device as other examples. An equipment operator uses a browser 120, and the pregnancy age table of hope is acquired [from] outside an ultrasonic device, and operation code software saves the table as a special order alumnus table at the diagnostic report parameter storage 84. When an opportunity to choose a pregnancy age table for an operator to evaluate embryonic age is given, a "special order table" option is chosen, and the pregnancy age table introduced by the equipment operator is used for an ultrasonic device controller, and embryonic age is presumed. Sending an ultrasonic image loop formation to other medical practitioners makes it possible to participate in a diagnosis or to give a diagnosis to the medical practitioner of a remote place by observing the real-time image loop formation acquired in other locations. That is, although referred to other medical practitioners, the medical practitioner under diagnosis can image a patient, to it, he can create a report of an ultrasonic device, and, subsequently can send to the medical practitioner who wants to refer for this image and a report directly from equipment as an attached paper of an electronic message or this message using the electronic message transceiver capacity of equipment.

[0030] The electronic communication link from an ultrasonic device is useful to analysis of an equipment performance issue and a question. With the image acquired at the time of problem generating, an ultrasonic device operator can be clear-headed equipment error record, and can send [record] to an equipment manufacturer, and a manufacturer is enabled to diagnose the problem about the equipment engine performance from a remote place. A manufacturer can receive equipment data immediately, when a problem occurs, and although the not clear problem which arises only in a certain situation irregularly is clarified, this is greatly useful. An electronic message system can be constituted so that equipment information, such as equipment error record, a condition, and a setup, may be acquired automatically, when a problem arises, and when a problem occurs, error record can be automatically sent to a manufacturer or a repair man. While a manufacturer or a repair man receives them, those messages and those information can be examined, and repair or adjustment can tell an equipment operator about whether it is the need at an ultrasonic device, judging from the information. A manufacturer turns up and asks an ultrasonic device operator by the electronic message or other media, they are beneficial to a check, or if it seems that he is useful, he can charge additional information.

[0031] If each ultrasonic device has the electronic mail box of itself, a manufacturer can send the notice about equipment to the mail box of equipment quickly and easily directly. New application, diagnostic information, or the information about a setup can be used for being sent to the ultrasonic devices (for example, a premium, a mid range, a cardiology, a general image processing, digital, etc.) of various molds by the manufacturer, improving an old usage, or performing a new approach. In the suitable example, each ultrasonic device has an electronic message address characteristic in itself for transmission and reception of an electronic message. For example, in order to identify an ultrasonic device and its mail box quickly and certainly, it is desirable to connect the serial number of an ultrasonic device with the electronic mail box address peculiar to equipment. In order that the owner of an ultrasonic device may restrict access to a message only to those who accepted the access permission, the electronic mail box is protected with the password. The data of an ultrasonic device can carry out dispatch pre-editing, such as deleting a patient's identifier, before the dispatch of an image and a report for a nondisclosure. The hope to a more advanced nondisclosure can be attained by enciphering data before dispatch.

[0032] It makes it possible to allow an ultrasonic device operator to access a browser 100 at the information about other ultrasonic practitioners, and for it to enable a medical practitioner to exchange their coworker and ultrasonic device e-mail address, for example, to advance exchange of a communication link of diagnostic information and others further. An equipment manufacturer can put the information on the device address [can organize a web page, for example,] to release among their coworkers, and others into a post.

[0033] Sending an electronic message can assist opting for the actual condition-demographic statistics (demographics) of a user trial, and use with a hospital. For example, it is programmable to identify a patient's demographic statistics and the report which are called the woman exceeding 40 years old which

is undergoing alumnus inspection for the ultrasonic device controller and which suited a certain criteria. With the conclusion of inspection, the created message by which then, the inspection report and the image were automatically sent to the core of hospitals, such as HIS, by the electronic message, and were saved in the message library 122 in it is used, and such demographic statistics are saved, or the kind of inspection research is done. Inspection is automatically sent also to the specialist of hospitals of the medical field concerned, such as a delivery medical medical practitioner of the pregnancy speciality of the woman exceeding 40 years old. Another useful property of assisting management of the ultrasonic resource of a hospital is automatic dispatch into the hospital administration section for every day or week of the inspection number of cases which the ultrasonic device carried out for each day or a week, and the electronic message containing the die length of the time amount which each inspection took, and enables a hospital administration person to update patient record and a memo. This can be again carried out by the message which is saved to the message library 122 and which was prepared previously. By hope, a CGI program can create periodically the HTML page which has the information for which it wishes into it, and the page is accessed by a hospital administration person's browser when the data is required.

[0034] Other operation of the transceiver capacity of an electronic message is calling the medical practitioner who is standing by. In the example of a configuration, if one carbon button of an ultrasonic device is pushed, equipment will send the electronic message of the method which the pocket bell service prepared beforehand uses to pocket bell service with a modem 32 or a network modem. The message which pocket bell service received recognizes the telephone number of a pocket bell, for example, gives the message of the alphabetic character of "telephone the No. 7 laboratory about an ultrasonic examination" sent to a pocket bell. Immediately after receiving a message, pocket bell service sends a message to the pocket bell of the waiting medical practitioner who is present in a hospital. A message can also be required as calling an equipment operator, in order to specify an ultrasonic device, to participate in a diagnosis difficult for a medical practitioner or to draw a diagnosis. This capacity makes possible what ultrasonographer asks quickly to a doctor in charge, when the decision on a decisive diagnosis is needed.

[0035] A browser 100 enables an ultrasonic device operator to access the baseline comparison supersonic-wave image in a remote library in clinical [the]. An equipment manufacturer, a university, a special organization, a large hospital and a clinic, and others can collect and accumulate such an ultrasonic image library. An image library may exist in other sites of the Internet or a network, or even its hard disk of a connection server, CD-ROM, or equipment is locally available. When carrying out the image processing of the pathology which a medical practitioner does not know well, a medical practitioner can access an image library through a browser 100. On the display of an ultrasonic device, it arranges horizontally, and it is displayed, is compared [the reference image from a library is called, and] with a patient's pathology, and is assistance [diagnosis]. Such capacity is shown in drawing 2 and drawing shows two ultrasonic devices 200 and 202 linked to the hub 304 of the Ethernet network 300. The terminal or workstation 302 of a network administrator, the reference image library 400 containing a server 404 and the HIS (HIS) that has a server 504, or the radiology information system (RIS) 500 is also connected to a hub 304. Each network equipment has a modem for connecting with other information sources, and a network also has the network modem 306 for a communication link of 300 from a network 300.

[0036] In the example of drawing 2 , both ultrasonic devices 200 and 202 connected to a network 300 can be used for the reference image library 400, and other equipments can access the reference image library 400 via the library modem 402 or the network modem 306. A library can be protected with a password so that only the user who was able to give the accepted password may be allowed access. When there is access, a library 400 presents the HTML page which has various inspection items, such as the obstetrics, a department of the abdominal cavity, and a department of the heart, on a user's browser. An operator can choose the selection branch of an inspection category, and branching selection can be made to the more detailed hierarchy of inspection, pathology, and conditions, or an operator can only type a series of identifiers, such as "obstetrics-embryo-head-3 month 3", and self can be led to the image

currently looked for directly. Thus, he narrows the focus of selection or accesses the image of a directly required class until the image of the pathology for which it wishes, or conditions is found by the library user. An ultrasonic device operator receives the ultrasonic image expected of an ultrasonic device (pull), can compare with a patient's ultrasonic image automatically with hand control, can copy on a display 70, and can do a **-strike. An operator compares a patient's image with the reference image from a library, and can be taken as the assistance of a diagnosis a patient's symptom.

[0037] As mentioned above, in order to access by the browser of equipment, the local library of a reference image may be saved on an ultrasonic device. A reference image library can be saved to any media of an accessible ultrasonic device by the browser. In drawing 1 , a reference image library may be saved at some devices of a storage 24, and a browser 100 is enabled to access a reference image library by use of a server 30. In the example of drawing 3 , a reference image library is saved at the removable magneto-optic disk used on MO drive 80. By putting a library on removable disk media, renewal of a new image library or a new library can be loaded to equipment at any time. As mentioned above, a browser 120 is used for access to the image library on the ultrasonic device which leads a server, and the reference image to wish to have can be reached by selection of a selection branch, or the direct access to a selection image. Next, a reference image is used as an image for a comparison, and gives the diagnostic creation from the image obtained by the ultrasonic device. The capacity which displays a reference image on equipment is also useful to training of a new ultrasonic device user.

[0038] The browser 100 has the application of others of a large number important for an ultrasonic clinician. An equipment user can use a browser 100, although the ultrasonic image before saved to equipment is seen. A browser performs this like the request by the external terminal by using a server 30 and displaying an equipment patient image directory on the equipment monitor 70. By connecting with a remote site by the modem 32 or network connection 50, a browser can be operated so that an image and a report may be sent to a remote place. A browser is applicable also to access to the radiology information equipment 500 in a hospital and a hospital, or a network, and can see laboratory reporting, a medical practitioner's schedule, and others. A browser 100 can also be used for training or actuation information retrieval. Even the manual of the operator of useful information; an equipment "help" message, and an ultrasonic device can be electronically saved to equipments, such as a disk or CD-ROM, and can be accessed through a browser 100, and use of an operator's ultrasonic device is guided.

[0039] If this invention is summarized, it will be the ultrasonic diagnosis image processing system which has a data access and communication capability, and the ultrasonic diagnosis image processing system which can access an image and information will be offered by PURAUZA from the database of the interior or the exterior. Access to such an image or information is performed through global networks, such as a regional network or the Internet. A browser is used in order for the image which serves as reference from for example, equipment presetting data or a reference image library to come to hand.

[0040] The mode of this invention is shown below.

Browser Software Which is Medical Diagnostic Ultrasonic Device Which Creates and Saves Diagnostic-Ultrasound Image or Diagnostic Report, and was Installed in :this Ultrasonic Device; 1. Reach. It consists of a means to connect this browser software with the external database of this ultrasonic device. By this Are well-informed about the image or information saved outside in this browser software. This medical diagnostic ultrasonic device accessible from a remote place, 2. Said medical diagnostic ultrasonic device of 1 with which this browser software consists of a means to see hyper-text data, 3. Said medical diagnostic ultrasonic device of 1 with which this connecting means consists of a means to connect this browser software to a network, 4. Said 3 medical diagnostic ultrasonic devices with which a means to connect this browser software with a network consists of TCP/IP software further, 5. Said 4 medical diagnostic ultrasonic devices with which a means to connect this browser software with a network consists of PPP software further, 6. Said 5 medical diagnostic ultrasonic devices with which a means to connect this browser software with a network consists of a modem further, 7. This ultrasonic device consists of a user interface which controls actuation of this ultrasonic device further. Said medical diagnostic ultrasonic device of 1 with which this browser

software is also operated by this user interface here, 8. Said 7 medical diagnostic ultrasonic devices with which this user interface has image display, 9. Said 7 medical diagnostic ultrasonic devices with which this user interface has a keyboard, 10. This user interface becomes said medical diagnostic ultrasonic device containing a trackball of 7, and 11. pan from a means to connect this browser software with the information source of the reference image of the exterior of this ultrasonic device. By this Browser software is led to the reference image saved outside from a remote place. Said accessible medical diagnostic ultrasonic device of 1, 12. Said 11 medical diagnostic ultrasonic devices with which this browser software consists of a means to see hyper-text data, 13. Said 11 medical diagnostic ultrasonic devices with which a means to connect consists of a means to connect this browser software to a network, 14. Said 13 medical diagnostic ultrasonic devices with which a means to connect this browser software to a network consists of a modem further, 15. -- the display with which this ultrasonic device displays further the ultrasonic image created by the ultrasonic device -- containing --; -- and further Said 11 medical diagnostic ultrasonic devices which consist of a means to display a reference image on this display that adjoined the ultrasonic image created by the ultrasonic device, 16. -- electronic message software; further installed in this ultrasonic device -- and It connects with this electronic message software. An electronic message to the information source of the exterior of this ultrasonic device Delivery, It consists of a means to connect to a network said medical diagnostic ultrasonic device of 1 and 17. this electronic message software which consist of a means to receive an electronic message from this information source. And by this Said 16 medical diagnostic ultrasonic devices with which this ultrasonic device can transmit and receive an electronic message through this network, 18. a means to connect this electronic message software to a network Said 17 medical diagnostic ultrasonic devices which furthermore consist of TCP/IP software, 19. a means to connect this electronic message software to a network Said 18 medical diagnostic ultrasonic devices which furthermore consist of PPP software, 20. a means to connect this electronic message software to a network Said medical diagnostic ultrasonic device of 19 and 21. this ultrasonic device which furthermore consist of a modem further It consists of a user interface which controls actuation of this ultrasonic device. Here Said 20 medical diagnostic ultrasonic devices with which this electronic message software is also operated by this user interface, 22. Said 21 medical diagnostic ultrasonic devices with which this user interface has image display, 23. Said 21 medical diagnostic ultrasonic devices with which this user interface contains a keyboard, 24. Said 21 medical diagnostic ultrasonic devices with which this user interface contains a trackball, 25. Are the medical diagnostic ultrasonic device which creates and saves a diagnostic supersonic-wave image or a diagnostic report, and it connects as some :this ultrasonic devices. The store which saves this ultrasonic image or a report; in order to access browser software; installed in this ultrasonic device, and the information saved at this store A means to connect with this browser software; to the image or report saved at this storage by this This browser software is led. An accessible medical diagnostic ultrasonic device, 26. Said 25 medical diagnostic ultrasonic devices with which a means to connect with this browser software consists of a server, 27. Said 25 medical diagnostic ultrasonic devices with which this browser software consists of a means to see this ultrasonic image or a report through a hypertext link, 28. Said 25 medical diagnostic ultrasonic devices with which this storage consists of an ultrasonic image memory, 29. in order that this ultrasonic device may access further the ultrasonic image or report which this browser saved here at this storage including the user interface for actuation of this ultrasonic device This user interface is led. Said 25 operational medical diagnostic ultrasonic devices, 30. -- browser software; which creates and saves a diagnostic supersonic-wave image or a diagnostic report and which is a medical diagnostic ultrasonic device and was installed in :this ultrasonic device -- and It consists of a means to connect this browser software to the Internet. The image or information saved outside leads the Internet here. The image or information which an accessible medical diagnostic ultrasonic device and 31. this browser software have the World Wide Web and compatibility of the Internet from a remote place with this browser software, and was saved here outside is the world wye dough of the Internet. EBU is led. With this browser software Said 30 medical diagnostic ultrasonic devices accessible from a remote place, 32. Said 30 medical diagnostic ultrasonic devices with which this browser software consists of a means to see hyper-text data, 33. a means to connect with a network said medical

diagnostic ultrasonic device 34. this browser software of 30 with which a means to connect consists of a means to connect this browser software to a network Said 33 medical diagnostic ultrasonic devices which furthermore consist of TCP/IP software, 35. Said 33 medical diagnostic ultrasonic devices with which a means to connect this browser software to a network consists of PPP software further, 36. Said 33 medical diagnostic ultrasonic devices with which a means to connect this browser software to a network consists of a modem further, 37. Said 30 medical diagnostic ultrasonic devices with which this ultrasonic device has the user interface which controls actuation of this ultrasonic device further, and this browser software is also operated by this user interface here.

[0041]

[Effect of the Invention] An ultrasonic device operator becomes accessible to other equipments or the data on a network, such as data of a patient or a medical practitioner saved at a reference diagnostic image or the HIS, and becomes possible [pulling out the information on an image and others] from a remote place. Moreover, a manufacturer's the newest notice and diagnostic information can be acquired, equipment information, such as actuation of equipment and a service manual, can be perused, and a specific checking device setup can be searched from other ultrasonic devices or preservation locations.

[Translation done.]

*** NOTICES ***

**JPO and NCIPI are not responsible for any
damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the ultrasonic diagnosis image processing system which has a data access and communication capability. Moreover, this invention equipment is related with amelioration of the data from other ultrasonic devices and information sources, an image, a message, and a ultrasonic diagnosis image processing system accessible to the information on other classes. this invention -- a part of United States patent [application serial number 08 / September 25, 1996 [719,360 or] application] -- it is continuation application.

[Translation done.]

*** NOTICES ***

**JPO and NCIPPI are not responsible for any
damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] An United States patent [the application serial numbers 08/719,360] transmits an ultrasonic image and a report through World Wide Web, and the ultrasonic diagnosis image processing system which has the HTTP server which makes it possible to access an ultrasonic device is indicated, and a medical practitioner makes it substantial to examine the diagnostic result which the ultrasonic device saves in the world possible also from what computer terminal. "Length" The capacity to access this ultrasonic device and to search information and an image takes out a characterization eclipse from there, and a medical practitioner takes out the information on an ultrasonic device from a remote place as a "length (pull)" technique. This accomplishes "push (push)" technique of an advanced-technology supersonic-wave network, and good contrast, and what information "is pushed for" on a network or a frame extraction person positively from an ultrasonic device before information is disseminated to the ultrasonic device exterior, or before being used is required of an ultrasonic device operator there.

[Translation done.]

*** NOTICES ***

JPO and NCIPPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] An ultrasonic device operator becomes accessible to other equipments or the data on a network, such as data of a patient or a medical practitioner saved at a reference diagnostic image or the HIS, and becomes possible [pulling out the information on an image and others] from a remote place. Moreover, a manufacturer's the newest notice and diagnostic information can be acquired, equipment information, such as actuation of equipment and a service manual, can be perused, and a specific checking device setup can be searched from other ultrasonic devices or preservation locations.

[Translation done.]

*** NOTICES ***

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] It is desirable for an ultrasonic device operator to access the information on a remote place from an ultrasonic device in addition to enabling the user of a remote place to access information, to offer the capacity "lengthens" this information to an ultrasonic device, and to assist an ultrasonic examination. For example, a medical practitioner may be uncertain about the symptom on the pathology in the scanned ultrasonic image. Probably, at this time, the medical practitioner wants to compare the acquired image with the image of a well-known pathology symptom. This becomes easy by making it possible to call an image to refer to from the library of the image of the pathology condition that a medical practitioner is well-known. Probably, such a library exists in the regional network by which the ultrasonic device is connected to ultrasonic device itself, or the remote place.

[0004] As other examples, an ultrasonic device operator may have the group of the presetting of specific equipment to use for a specific inspection. A setup of an ultrasonic device is initialized for the inspection, or, as for such presetting, obstetric measurement etc. performs beforehand regular inspection. The operator may have saved them with other ultrasonic devices at network storage before, using presetting. It is desirable that it can call to inspection which carries them out after this so that an operator can perform the presetting automatically from other ultrasonic devices or preservation locations.

[0005] Moreover, it has a desirable ultrasonic device operator for other direct medical practitioners and a location, and a communication link to be also possible. For example, the ultrasonographer who inspected the patient will call the medical practitioner who is diagnosing, and will recheck the just acquired ultrasonic image, and will think that he wants to draw a diagnosis. For ultrasonographer, probably a medical practitioner will be called from an ultrasonic device and it will be convenient for a medical practitioner's office in a message delivery or that a medical practitioner can be immediately contacted in somewhere in hospitals.

[0006] Probably, it will be desirable that it is also the direct ready-for-sending ability from an ultrasonic device for an ultrasonic device operator about the image or diagnostic report acquired to the medical practitioner of other locations. For example, thereby, from the image on an ultrasonic device, and a report, the medical practitioner who is diagnosing can draw a diagnosis immediately, and can tell the medical practitioner who wants to consult about this diagnosis and the image which supports it, and a report directly, and can make urgent attention pay [rather than] to a sick patient.

[0007] It is also desirable to provide an ultrasonic device operator with the immediate access to an ultrasonic device and the newest information about the capacity. An operator accesses immediately the newest actuation information which enables activation of the highest ultrasonic examination also in the conditions on an ultrasonic probe, a monitor configuration, and what kind of pathology. Also when a notice and a report of such information can be sent to a direct ultrasonic device and it is not made to it for a manufacturer, an operator needs to acquire such information quickly.

[0008] It is still more desirable to an ultrasonic device operator that direct access can be carried out to the various information on the database of other area of a hospital. The information about the medical practitioner and patient who exist in the information system of a hospital carries out direct access from

an ultrasonic device. Also for the information system of a hospital, direct information is acquired from an ultrasonic device, and it is necessary to acquire the information about use of an ultrasonic device or patient record, and the information for chart creation.

[Translation done.]

*** NOTICES ***

JPO and NCIPPI are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] According to this invention, a ultrasonic diagnosis image processing system is provided with the above-mentioned capacity by inclusion of the browser to an ultrasonic device. A browser is software which enables an ultrasonic device operator to see a hypertext document. Such a hypertext document can exist on ultrasonic device itself, or can come to hand in other locations. An ultrasonic device operator can use a browser, in order to pull out the information on an ultrasonic image and others from these locations to an ultrasonic device. This enables him for an operator to access equipment or the reference diagnostic image of other locations, and to access other equipments or the data on a network, such as data of a patient or a medical practitioner saved at the HIS. A browser can access a manufacturer's the newest notice and diagnostic information, and can also be used for reading electronically equipment information, such as device operation or a service manual, carefully again. An operator can search the presetting for a specific inspection from other ultrasonic devices or preservation locations by the browser.

[0010] As for the contents of the drawing, drawing 1 explains the ultrasonic diagnosis image processing system which has a browser by this invention in a block diagram format. Drawing 2 explains to the library of a reference image and the HIS the network which makes an ultrasonic device accessible. Drawing 3 explains the interaction of the browser in which an image processing is possible, and the control equipment of a ultrasonic diagnosis image processing system in a block diagram format.

[0011]

[The mode of implementation of invention] The ultrasonic diagnosis image processing system 10 of this invention is shown in drawing 1 and 3. An ultrasonic device 10 sends a supersonic wave to a patient's inside of the body, the echo which returns from a dispatch wave, an organ in the living body, and an interaction with an organization is received, and the well-known component of a large number containing the scan head 14 which has the ultrasonic transducer 12 which changes a reception echo into an electric echo signal is contained. An electric echo signal is suitably delayed with the beam formation vessel 16, and it is combined and it forms the coherent beam of echo information. The beam of echo information is processed by the signal processor 64 according to the mold of the diagnostic information (for example, an B mode, Doppler, dye bleeding, etc.) which it is going to obtain. By transmitting the processed echo information to the display processor 68, and forming an ultrasonic image, it is saved at an image and the report storage 24, and it is displayed on a display 70, or the both are made.

[0012] Actuation of an ultrasonic device 10 is under management of a control panel 20, and an operator interacts control instruction with delivery or the ultrasonic device controller 18 with this control panel. A controller with many controllable users, such as a keyboard 22, a trackball 26, and the selection key 27, is usually contained in a control panel 20. Control of the control panel (according to the time, called a "softkey") with which an operator can interact is called a user interface with a video presentation controller. An operator operates a user interface, uses the report creation software package usually saved in the ultrasonic device or the attached diagnostic module, and also creates the diagnostic report of the carried-out ultrasonic examination. A diagnostic report is displayed, is printed by the printer (not displayed on drawing), and is saved at an image and the report storage 24.

[0013] An ultrasonic device 10 has the HyperText Transfer Protocol (HTTP) server 30. The HTTP server 30 connects and accesses an ultrasonic image and a report from a storage 24, and enables the personal computer, terminal, or workstation of a remote place to access the image of equipment, and a report. In drawing 1 , it connects with a modem 32 and a server 30 accesses the exterior or a local communication network. A server 30 makes diagnostic information of an ultrasonic device 10 usable at the user who connects and accesses an ultrasonic device through communication networks, such as a network shown in drawing 2 .

[0014] A server 30 is connected to a modem 32 through a serial port 31. A modem 32 changes the continuation digital data from a serial port 31 into the analog signal which suits the communication link by the telephone line. A modem changes the inputted analog telephone signal into digital data again, and passes a serial port 31, and an ultrasonic device makes it usable. The suitable modem is available from the Hayes microcomputer products shrine (Hayes MicrocomputerProducts, Inc.) which established the specification currently used by many modem manufacturers.

[0015] The communication link by the modem 32 is established by the software known as PPP (point-to-point (point-to-point) protocol) software as shown with the block 48 of a drawing. PPP is specification which makes many network protocols usable through a modem circuit or other serial connection. Other specification [CSLIP / which is the special mold of SLIP (Serial Line Internet Protocol) or SLIP which is the specification which makes usable the communications protocol known as TCP/IP (it discusses below) by one modem circuit or other serial connection] (compression Serial Line Internet Protocol) of other specification is usable. After PPP software is installed in an ultrasonic device, it must be initialized or set to the ultrasonic device with which it is operated, and modems. Setting information controls PPP software to suit the property of the telephone number of the mold of the serial port used and the modem used, the telephone line, and a host and the dial approach, a log in procedure, a password, etc. Generally, setting information carries out a setup about network connection initiation, such as when connection is started and what after connection is established, happens. PPP software is contained in some operating system software packages for the IBM compatible personal computers, such as Windows 95 of Microsoft Corp. of Washington and Redmond (Microsoft Corporation of Redmond, Washington). The PPP software for the Apple Computer personal computers is especially available from Virginia and the INTAKON system corporation (InterCon Systems Corporation of Herndon, Virginia) of Herndon.

[0016] The communication link by PPP software is a network protocol called a TCP/IP Internet protocol suite (Suite). TCP/IP is named from the Internet Protocol (IP) and the communications control protocol (TCP) which are two protocols used most widely. IP protocol controls the path (routing) of data, and a TCP protocol controls a data transfer. TCP/IP offers the common means of connection which led the packet transfer device known as the gateway. The gateway is the internetworking computer of the dedication which determines the path of the packet of an epilogue and the data between them for 2 or the network beyond it.

[0017] When there are data which the ultrasonic device considers want to transmit through the Internet or other networks, these data are moved to TCP/IP shown with the block 46 of drawing. TCP clarifies a destination, checks it and encapsulates data to the segment called the TCP packet which has the header information used for rearranging a data segment into suitable sequence. Since a data block is sent through the Internet as each packet, each packet can give the path which changes with gateways, it is order with the suitable packet, or any guarantees cannot be found in arriving without an error at the destination. A TCP packet offers a means to guarantee packet delivery, coordination, and sequence arrangement. At a reception place, as for a packet, an error is checked according to TCP packet header information, an error-less segment is received, and these packets are rearranged and are reconfigured by the block at the time of data dispatch. A transmitting person leaves record of segment receipt, and when the segment is not received on time, a transmitting person broadcasts a packet again. when a segment is lost in the first dispatch or it is not received exactly, until, as for TCP, all segments are received at a reception place -- a receiving segment -- holding -- a degree -- them -- the relocation to the block at the time of transmission of data -- those -- suitable -- it ** and is rearranged into perfect

sequence.

[0018] At a transmission place, a TCP packet is sent to IP and it makes a segment the form of an IP packet or datagram (datagram). Datagram has IP header which offers the addressing information used by the gateway and which determines the path of the datagram to the suitable destination. IP header has the Internet address of a transmission place and a reception place, and enables an addressee that the gateway ships data on the suitable root, and to check receipt of datagram. Although IP is tried so that it may do its best to send all datagram, it does not guarantee those attainment. The guarantee of delivery is offered by TCP through receipt acknowledgement and retransmission of message as mentioned above.

[0019] TCP/IP needs to be constituted by a specific ultrasonic device and its specific object for environments like PPP software. the information about the mold of the regional network by which the network in an area of the ultrasonic device (for example, Ethernet or a token-sharing network) is carried out to other ultrasonic devices at the typical configuration information of TCP/IP if it becomes, and the information about the address of other equipments on a regional network -- equipment is performing a router function -- if it becomes, there are the address of the server of the gateway address, the user name of an ultrasonic device and the password for access, and an ultrasonic device, the Internet address (IP address) of an ultrasonic device, and a default domain of a regional network. The available thing for Apple Computer from INTAKON of TCP/IP software as well as PPP is available with some system software packages, such as Windows 95.

[0020] In drawing 1 , TCP/IP is connected to the Ethernet connection 50 in regional network media and this example. The Ethernet connection 50 connects an ultrasonic device with other equipments on a regional network. The linear bus by the carrier sensing multi-access which has carrier sense multiple access with collision detection (CSMA/CD) is used for a traditional Ethernet network. It is often described by the same specification which uses the mutual frame mode based on IEEE802.3. The Ethernet connection 50 is applicable to access to a local area network (LANs), a Wide Area Network (WANs), IEEE802.5 token ring, and other networking infrastructure structures. Data can communicate in an Ethernet (being former thing per second 10-megabit and the latest edition per second a maximum of 100 megabits) network at high speed, and each equipment is allowed a communication link only while other equipments are not sending through a system.

[0021] The HTTP server 30 interacts with the network software of TCP/IP and PPP. A HTTP server is a software program used for a communication link for a web browser to access information from an ultrasonic device. a HTTP server -- the web page of additions, such as web page information, an ultrasonic image, and a report, and the hypertext connection with information -- displaying -- the interior or the exterior -- it answers for asking. a HTTP server -- moreover, it is further indicated by original application at a detail -- as -- the exterior -- it answers for asking and a specific activity is carried out in relation to the carbon button or controller on an ultrasonic device.

[0022] Answering an external demand, the HTTP server 30 sends the HyperText-Markup-Language (HTML) page 34 to a demand place web browser. A HTML page describes a carbon button, a text, an image, the animation-ized real-time loop formation, sound, and what [other] a web browser displays on the screen of a remote terminal. A HTML page can be directly encoded by software according to the directions released to many reference reference, such as the "release HTML and CGI" (HTML and CGI Unleashed, by John December and Mark Ginsburg, published by Sams.net Publishing, Indianapolis, Indiana.) etc. of John DISSEMBA released by Sams network publication of Indiana and Indianapolis, and the Mark Ginsberg work. It can create commercially using available desktop publishing and word-processing software, and can encode in a HTML format using the software known as an Internet assistant next, or the same software as a function top, and an easy HTML page can download the above-mentioned software through the homepage of Microsoft WWW.microsoft.com. By hope, the public domain software known as a web manufacturer (Webmaker) can be downloaded from the Internet, and it can be used for creation of a web page. A web page has the HTML tag of the data which indicate how a page should be interpreted by the web browser. The link to an ultrasonic image file is given with the IMG tag in a web page code. Referring to the HREF hypertext offers the link means to the web page of other ones on the link means to other web pages or network of the same ultrasonic device, or a web of

host devices. Once a HTML page is created, they will be copied to an ultrasonic device and a HTTP server will be provided with those preservation addresses. When requiring that a remote terminal or a browser should look at the specific web page of an ultrasonic device, the HTTP server 30 always takes the responsibility of returning the contents for this page to a header and a claimant.

[0023] The small executable program of a large number called the common gateway interface (CGI) program shown in 36 is contained in an ultrasonic device 10. A CGI program offers the interface between the hardware of a HTML page and an ultrasonic device, and software. A CGI program is searched for so that the information which communicates with an ultrasonic device, and urges an activity to equipment, or is demanded [condition / an image, a report, or / current] may be offered. In the example of a configuration, a CGI program runs on information requirements by creating dynamically the of-special-make HTML page where the demanded information was embedded. Original application is performed corresponding to the CGI program and input argument (argument) which offer the display of an ultrasonic image and the patient directory of a report, and the selected ultrasonic image, carries out an equipment diagnosis, and explains actuation of a general purpose program of providing many ultrasonic devices on a network with a patient directory. In the example of a configuration, a CGI program is saved at the hard disk of the ultrasonic device of the directory named "cgi-bin." A CGI program accesses the ultrasonic image and report which are saved 24, although those actuation is performed, is accessed at the diagnostic routine saved 28, is performed, and it does a joint activity with the controller of an ultrasonic device through the ultrasonic device controller 18.

[0024] A small program fragment is embedded in a server code by hope, and is performed based on CGI processing. According to this invention, an ultrasonic device 10 contains the browser 100 in which the communication link which goes via a hypertext link with other sites (other ultrasonic devices, servers, terminals, etc.) with interested information is possible for an ultrasonic device user. The software which makes possible what an ultrasonic device operator looks at the hypertext document (HTML page) saved from an ultrasonic device at a remote place or the server on the ultrasonic device itself for is contained in a browser 100. It connects with the ultrasonic device controller 18, and a browser 100 does a mutual activity with an ultrasonic device storage and a display, and it is operational by the user interface of an ultrasonic device. By "clicking" the hypertext link of the displayed HTML page, a user is the key or trackball 26 of a keyboard 22, and operates the cursor of a browser display, and the information for which it wishes by the input key or the selection key 27 of a keyboard next is chosen. Browser software, such as the available Internet Explorer browser, enables an ultrasonic device operator easily to acquire the information on an image, a report, and others through the World Wide Web of a regional network or the Internet from an available thing or Microsoft Corp. from California and Netscape Communications Corporation of Mountain View.

[0025] The further viewpoint of this invention is that the easy e-mail communications protocol (SMTP) server 102 is contained in an ultrasonic device 10. An electronic message is transmitted [SMTP server 102] and received by TCP/IP46 via a regional network or the Internet through network connections, such as the Ethernet connection 50 or a modem 32. It connects with the ultrasonic device controller 18, and an SMTP server interacts with an ultrasonic device storage, a user interface, and a display. Software programs, such as a Eudora electronic communications program (Eudora electronic messaging program) containing the POP3 client protocol for electronic message reception and SMTP for dispatch, are employable with the POP3 client used in order to ask host equipment about the existence of a received message periodically. When a message is received by the ultrasonic device 10, SMTP server 102 displays a notice for an electronic message on a display 70 via reception and the device control machine 18. A message can be accessed through the user interface which used the keyboard 22, the trackball 26, or the selection key 27 next, and it is displayed on a display 70.

[0026] Generally, when other equipments function as a host system (POP host) of transmission and reception of a message, a POP3 client is used and full SMTP server mounting (implementation) is used for eternal Ethernet connection. The exchange of a message can be performed also by the HTTP server 30, and can send a message to other locations with a HTML page and a HTTP protocol. The electronic message transceiver capacity offered by SMTP server 102 is useful for the ultrasonic device operator

from various fields. An electronic message can also attach whether it saves at an ultrasonic device for dispatch to the persons concerned and the becoming information, such as all information on the others which exist on alumnus chart as which an ultrasonic image, a report (or each count), an ultrasonic image loop formation, the presetting of equipment, and a user entered or a formula, equipment error record, or an ultrasonic device. Similarly, an operator can receive such information from other locations, and can use it with an ultrasonic device.

[0027] The capacity to send an electronic message from an ultrasonic device makes it possible to acquire information from other persons quickly and easily to an operator. The medical practitioner of other locations gives notes and critical information which serve as a guide of delivery and an ultrasonic examination in the message related to a future inspection performed on equipment to an ultrasonic device. It makes it possible to carry out the same inspection with the ultrasonic device of other locations automatically without the need of setting up a device manually so that inspection by which delivery or capacity to search was carried out in the presetting of the equipment of given inspection in other locations may be carried out again. Though the ultrasonographer who uses many ultrasonic devices of various locations can save him or her desirable equipment presetting at the file of an ultrasonic device or a Network Server, and they can be quoted in an electronic message, it can refer to from a HTML page and ultrasonographer will perform an ultrasonic examination suddenly where on that day, it can be searched and used through the Internet or a network. A browser can be used for downloading a new user setup ******(ed) again from an equipment manufacturer, and a user can exchange monitor configurations by sending an electronic message. Similarly, it specialized or alumnus table designed for desirable alumnus table, specific culture, or a country can download a suitable diagnostic instrument from a remote place.

[0028] Drawing 3 explains a detail to the pan of actuation of such capacity. It is compiled in software code and it leads the received equipment presetting data to the suitable preservation area of an ultrasonic device, it is used by the ultrasonic device controller and a browser 120 controls the function of equipment by this example. When an operator uses a browser and accesses equipment presetting data from other ultrasonic devices or data storage, an operation (steering) code leads receiving set presetting data to scan parameter preservation equipment 82, and is saved as special order (custom) presetting data there. By hope, an operator can download direct special order presetting data to scan parameter preservation equipment 82 using file transfer protocol FTP. An operator operates a user controller and an operator chooses this special order presetting data (often called an "organization detail image-processing (Tissue Specific Imaging)" (trademark) setup) saved at the ultrasonic device instead of a standard set updater at the beginning of an image processing, when the option of a monitor configuration parameter is granted. The ultrasonic device controller 18 initializes an ultrasonic device next, and according to an operator's special order equipment presetting, it carries out a supersonic scan so that it may be shown by connection between the ultrasonic device controller 18, the beam formation machine 16 of an ultrasonic device, a signal processor 64, and the display processor 68.

[0029] It is assumed that an operator wants to use the pregnancy age table designed specially because of specific country people instead of the pregnancy age table installed in the ultrasonic device as other examples. An equipment operator uses a browser 120, and the pregnancy age table of hope is acquired [from] outside an ultrasonic device, and operation code software saves the table as a special order alumnus table at the diagnostic report parameter storage 84. When an opportunity to choose a pregnancy age table for an operator to evaluate embryonic age is given, a "special order table" option is chosen, and the pregnancy age table introduced by the equipment operator is used for an ultrasonic device controller, and embryonic age is presumed. Sending an ultrasonic image loop formation to other medical practitioners makes it possible to participate in a diagnosis or to give a diagnosis to the medical practitioner of a remote place by observing the real-time image loop formation acquired in other locations. That is, although referred to other medical practitioners, the medical practitioner under diagnosis can image a patient, to it, he can create a report of an ultrasonic device, and, subsequently can send to the medical practitioner who wants to refer for this image and a report directly from equipment as an attached paper of an electronic message or this message using the electronic message transceiver

capacity of equipment.

[0030] The electronic communication link from an ultrasonic device is useful to analysis of an equipment performance issue and a question. With the image acquired at the time of problem generating, an ultrasonic device operator can be clear-headed equipment error record, and can send [record] to an equipment manufacturer, and a manufacturer is enabled to diagnose the problem about the equipment engine performance from a remote place. A manufacturer can receive equipment data immediately, when a problem occurs, and although the not clear problem which arises only in a certain situation irregularly is clarified, this is greatly useful. An electronic message system can be constituted so that equipment information, such as equipment error record, a condition, and a setup, may be acquired automatically, when a problem arises, and when a problem occurs, error record can be automatically sent to a manufacturer or a repair man. While a manufacturer or a repair man receives them, those messages and those information can be examined, and repair or adjustment can tell an equipment operator about whether it is the need at an ultrasonic device, judging from the information. A manufacturer turns up and asks an ultrasonic device operator by the electronic message or other media, they are beneficial to a check, or if it seems that he is useful, he can charge additional information.

[0031] If each ultrasonic device has the electronic mail box of itself, a manufacturer can send the notice about equipment to the mail box of equipment quickly and easily directly. New application, diagnostic information, or the information about a setup can be used for being sent to the ultrasonic devices (for example, a premium, a mid range, a cardiology, a general image processing, digital, etc.) of various molds by the manufacturer, improving an old usage, or performing a new approach. In the suitable example, each ultrasonic device has an electronic message address characteristic in itself for transmission and reception of an electronic message. For example, in order to identify an ultrasonic device and its mail box quickly and certainly, it is desirable to connect the serial number of an ultrasonic device with the electronic mail box address peculiar to equipment. In order that the owner of an ultrasonic device may restrict access to a message only to those who accepted the access permission, the electronic mail box is protected with the password. The data of an ultrasonic device can carry out dispatch pre-editing, such as deleting a patient's identifier, before the dispatch of an image and a report for a nondisclosure. The hope to a more advanced nondisclosure can be attained by enciphering data before dispatch.

[0032] It makes it possible to allow an ultrasonic device operator to access a browser 100 at the information about other ultrasonic practitioners, and for it to enable a medical practitioner to exchange their coworker and ultrasonic device e-mail address, for example, to advance exchange of a communication link of diagnostic information and others further. An equipment manufacturer can put the information on the device address [can organize a web page, for example,] to release among their coworkers, and others into a post.

[0033] Sending an electronic message can assist opting for the actual condition-demographic statistics (demographics) of a user trial, and use with a hospital. For example, it is programmable to identify a patient's demographic statistics and the report which are called the woman exceeding 40 years old which is undergoing alumnus inspection for the ultrasonic device controller and which suited a certain criteria. With the conclusion of inspection, the created message by which then, the inspection report and the image were automatically sent to the core of hospitals, such as HIS, by the electronic message, and were saved in the message library 122 in it is used, and such demographic statistics are saved, or the kind of inspection research is done. Inspection is automatically sent also to the specialist of hospitals of the medical field concerned, such as a delivery medical medical practitioner of the pregnancy speciality of the woman exceeding 40 years old. Another useful property of assisting management of the ultrasonic resource of a hospital is automatic dispatch into the hospital administration section for every day or week of the inspection number of cases which the ultrasonic device carried out for each day or a week, and the electronic message containing the die length of the time amount which each inspection took, and enables a hospital administration person to update patient record and a memo. This can be again carried out by the message which is saved to the message library 122 and which was prepared previously. By hope, a CGI program can create periodically the HTML page which has the information for which it

wishes into it, and the page is accessed by a hospital administration person's browser when the data is required.

[0034] Other operation of the transceiver capacity of an electronic message is calling the medical practitioner who is standing by. In the example of a configuration, if one carbon button of an ultrasonic device is pushed, equipment will send the electronic message of the method which the pocket bell service prepared beforehand uses to pocket bell service with a modem 32 or a network modem. The message which pocket bell service received recognizes the telephone number of a pocket bell, for example, gives the message of the alphabetic character of "telephone the No. 7 laboratory about an ultrasonic examination" sent to a pocket bell. Immediately after receiving a message, pocket bell service sends a message to the pocket bell of the waiting medical practitioner who is present in a hospital. A message can also be required as calling an equipment operator, in order to specify an ultrasonic device, to participate in a diagnosis difficult for a medical practitioner or to draw a diagnosis. This capacity makes possible what ultrasonographer asks quickly to a doctor in charge, when the decision on a decisive diagnosis is needed.

[0035] A browser 100 enables an ultrasonic device operator to access the baseline comparison supersonic-wave image in a remote library in clinical [the]. An equipment manufacturer, a university, a special organization, a large hospital and a clinic, and others can collect and accumulate such an ultrasonic image library. An image library may exist in other sites of the Internet or a network, or even its hard disk of a connection server, CD-ROM, or equipment is locally available. When carrying out the image processing of the pathology which a medical practitioner does not know well, a medical practitioner can access an image library through a browser 100. On the display of an ultrasonic device, it arranges horizontally, and it is displayed, is compared [the reference image from a library is called, and] with a patient's pathology, and is assistance [diagnosis]. Such capacity is shown in drawing 2 and drawing shows two ultrasonic devices 200 and 202 linked to the hub 304 of the Ethernet network 300. The terminal or workstation 302 of a network administrator, the reference image library 400 containing a server 404 and the HIS (HIS) that has a server 504, or the radiology information system (RIS) 500 is also connected to a hub 304. Each network equipment has a modem for connecting with other information sources, and a network also has the network modem 306 for a communication link of 300 from a network 300.

[0036] In the example of drawing 2 , both ultrasonic devices 200 and 202 connected to a network 300 can be used for the reference image library 400, and other equipments can access the reference image library 400 via the library modem 402 or the network modem 306. A library can be protected with a password so that only the user who was able to give the accepted password may be allowed access. When there is access, a library 400 presents the HTML page which has various inspection items, such as the obstetrics, a department of the abdominal cavity, and a department of the heart, on a user's browser. An operator can choose the selection branch of an inspection category, and branching selection can be made to the more detailed hierarchy of inspection, pathology, and conditions, or an operator can only type a series of identifiers, such as "obstetrics-embryo-head-3 month 3", and self can be led to the image currently looked for directly. Thus, he narrows the focus of selection or accesses the image of a directly required class until the image of the pathology for which it wishes, or conditions is found by the library user. An ultrasonic device operator receives the ultrasonic image expected of an ultrasonic device (pull), can compare with a patient's ultrasonic image automatically with hand control, can copy on a display 70, and can do a **-strike. An operator compares a patient's image with the reference image from a library, and can be taken as the assistance of a diagnosis a patient's symptom.

[0037] As mentioned above, in order to access by the browser of equipment, the local library of a reference image may be saved on an ultrasonic device. A reference image library can be saved to any media of an accessible ultrasonic device by the browser. In drawing 1 , a reference image library may be saved at some devices of a storage 24, and a browser 100 is enabled to access a reference image library by use of a server 30. In the example of drawing 3 , a reference image library is saved at the removable magneto-optic disk used on MO drive 80. By putting a library on removable disk media, renewal of a new image library or a new library can be loaded to equipment at any time. As mentioned above, a

browser 120 is used for access to the image library on the ultrasonic device which leads a server, and the reference image to wish to have can be reached by selection of a selection branch, or the direct access to a selection image. Next, a reference image is used as an image for a comparison, and gives the diagnostic creation from the image obtained by the ultrasonic device. The capacity which displays a reference image on equipment is also useful to training of a new ultrasonic device user.

[0038] The browser 100 has the application of others of a large number important for an ultrasonic clinician. An equipment user can use a browser 100, although the ultrasonic image before saved to equipment is seen. A browser performs this like the request by the external terminal by using a server 30 and displaying an equipment patient image directory on the equipment monitor 70. By connecting with a remote site by the modem 32 or network connection 50, a browser can be operated so that an image and a report may be sent to a remote place. A browser is applicable also to access to the radiology information equipment 500 in a hospital and a hospital, or a network, and can see laboratory reporting, a medical practitioner's schedule, and others. A browser 100 can also be used for training or actuation information retrieval. Even the manual of the operator of useful information, an equipment "help" message, and an ultrasonic device can be electronically saved to equipments, such as a disk or CD-ROM, and can be accessed through a browser 100, and use of an operator's ultrasonic device is guided.

[0039] If this invention is summarized, it will be the ultrasonic diagnosis image processing system which has a data access and communication capability, and the ultrasonic diagnosis image processing system which can access an image and information will be offered by PURAUZA from the database of the interior or the exterior. Access to such an image or information is performed through global networks, such as a regional network or the Internet. A browser is used in order for the image which serves as reference from for example, equipment presetting data or a reference image library to come to hand.

[0040] The mode of this invention is shown below.

Browser Software Which is Medical Diagnostic Ultrasonic Device Which Creates and Saves Diagnostic-Ultrasound Image or Diagnostic Report, and was Installed in :this Ultrasonic Device; 1. Reach. It consists of a means to connect this browser software with the external database of this ultrasonic device. By this Are well-informed about the image or information saved outside in this browser software. This medical diagnostic ultrasonic device accessible from a remote place, 2. Said medical diagnostic ultrasonic device of 1 with which this browser software consists of a means to see hyper-text data, 3. Said medical diagnostic ultrasonic device of 1 with which this connecting means consists of a means to connect this browser software to a network, 4. Said 3 medical diagnostic ultrasonic devices with which a means to connect this browser software with a network consists of TCP/IP software further, 5. Said 4 medical diagnostic ultrasonic devices with which a means to connect this browser software with a network consists of PPP software further, 6. Said 5 medical diagnostic ultrasonic devices with which a means to connect this browser software with a network consists of a modem further, 7. This ultrasonic device consists of a user interface which controls actuation of this ultrasonic device further. Said medical diagnostic ultrasonic device of 1 with which this browser software is also operated by this user interface here, 8. Said 7 medical diagnostic ultrasonic devices with which this user interface has image display, 9. Said 7 medical diagnostic ultrasonic devices with which this user interface has a keyboard, 10. This user interface becomes said medical diagnostic ultrasonic device containing a trackball of 7, and 11. pan from a means to connect this browser software with the information source of the reference image of the exterior of this ultrasonic device. By this Browser software is led to the reference image saved outside from a remote place. Said accessible medical diagnostic ultrasonic device of 1, 12. Said 11 medical diagnostic ultrasonic devices with which this browser software consists of a means to see hyper-text data, 13. Said 11 medical diagnostic ultrasonic devices with which a means to connect consists of a means to connect this browser software to a network, 14. Said 13 medical diagnostic ultrasonic devices with which a means to connect this browser software to a network consists of a modem further, 15. -- the display with which this ultrasonic device displays further the ultrasonic image created by the ultrasonic device -- containing --; -- and further Said 11 medical diagnostic ultrasonic devices which consist of a means to display a reference image on this

display that adjoined the ultrasonic image created by the ultrasonic device, 16. -- electronic message software; further installed in this ultrasonic device -- and It connects with this electronic message software. An electronic message to the information source of the exterior of this ultrasonic device Delivery, It consists of a means to connect to a network said medical diagnostic ultrasonic device of 1 and 17. this electronic message software which consist of a means to receive an electronic message from this information source. And by this Said 16 medical diagnostic ultrasonic devices with which this ultrasonic device can transmit and receive an electronic message through this network, 18. a means to connect this electronic message software to a network Said 17 medical diagnostic ultrasonic devices which furthermore consist of TCP/IP software, 19. a means to connect this electronic message software to a network Said 18 medical diagnostic ultrasonic devices which furthermore consist of PPP software, 20. a means to connect this electronic message software to a network Said medical diagnostic ultrasonic device of 19 and 21. this ultrasonic device which furthermore consist of a modem further It consists of a user interface which controls actuation of this ultrasonic device. Here Said 20 medical diagnostic ultrasonic devices with which this electronic message software is also operated by this user interface, 22. Said 21 medical diagnostic ultrasonic devices with which this user interface has image display, 23. Said 21 medical diagnostic ultrasonic devices with which this user interface contains a keyboard, 24. Said 21 medical diagnostic ultrasonic devices with which this user interface contains a trackball, 25. Are the medical diagnostic ultrasonic device which creates and saves a diagnostic supersonic-wave image or a diagnostic report, and it connects as some :this ultrasonic devices. The store which saves this ultrasonic image or a report; in order to access browser software; installed in this ultrasonic device, and the information saved at this store A means to connect with this browser software; to the image or report saved at this storage by this This browser software is led. An accessible medical diagnostic ultrasonic device, 26. Said 25 medical diagnostic ultrasonic devices with which a means to connect with this browser software consists of a server, 27. Said 25 medical diagnostic ultrasonic devices with which this browser software consists of a means to see this ultrasonic image or a report through a hypertext link, 28. Said 25 medical diagnostic ultrasonic devices with which this storage consists of an ultrasonic image memory, 29. in order that this ultrasonic device may access further the ultrasonic image or report which this browser saved here at this storage including the user interface for actuation of this ultrasonic device This user interface is led. Said 25 operational medical diagnostic ultrasonic devices, 30. -- browser software; which creates and saves a diagnostic supersonic-wave image or a diagnostic report and which is a medical diagnostic ultrasonic device and was installed in :this ultrasonic device -- and It consists of a means to connect this browser software to the Internet, and an accessible medical diagnostic ultrasonic device and 31. this browser software from a remote place with this browser software through the Internet, [the image or information saved here outside] The image or information which there are the World Wide Web and compatibility of the Internet and was saved here outside The World Wide Web of the Internet is led. With this browser software Said 30 medical diagnostic ultrasonic devices accessible from a remote place, 32. Said 30 medical diagnostic ultrasonic devices with which this browser software consists of a means to see hyper-text data, 33. a means to connect with a network said medical diagnostic ultrasonic device 34. this browser software of 30 with which a means to connect consists of a means to connect this browser software to a network Said 33 medical diagnostic ultrasonic devices which furthermore consist of TCP/IP software, 35. Said 33 medical diagnostic ultrasonic devices with which a means to connect this browser software to a network consists of PPP software further, 36. Said 33 medical diagnostic ultrasonic devices with which a means to connect this browser software to a network consists of a modem further, 37. Said 30 medical diagnostic ultrasonic devices with which this ultrasonic device has the user interface which controls actuation of this ultrasonic device further, and this browser software is also operated by this user interface here.

[Translation done.]

*** NOTICES ***

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of a ultrasonic diagnosis image processing system which has a browser by this invention.

[Drawing 2] The network which makes an ultrasonic device accessible is explained to the library of a reference image and the HIS.

[Drawing 3] It is the block diagram of the interaction of a browser and the control equipment of an ultrasonic device.

[Description of Notations]

10 ... An ultrasonic device, 12 ... An ultrasonic transducer, 14 ... Scan head, 16 ... A beam formation machine, 18 ... An ultrasonic device controller, 20 ... Control panel, 22 ... A keyboard, 24 ... An image and a report storage, 26 ... Trackball, 27 ... A selection key, 30 ... HyperText Transfer Protocol server, 31 ... A serial port, 32 ... A modem, 50 ... Ethernet connection, 64 ... A signal processor, 68 ... A display processor, 70 ... Display, 82 [... An SMTP server, 300 / ... An Ethernet work piece, 304 / ... A hub, 306 / ... A network modem, 400 / ... Library.] ... Scan parameter preservation equipment, 84 ... A diagnostic report parameter storage, 100 ... A browser, 102

[Translation done.]

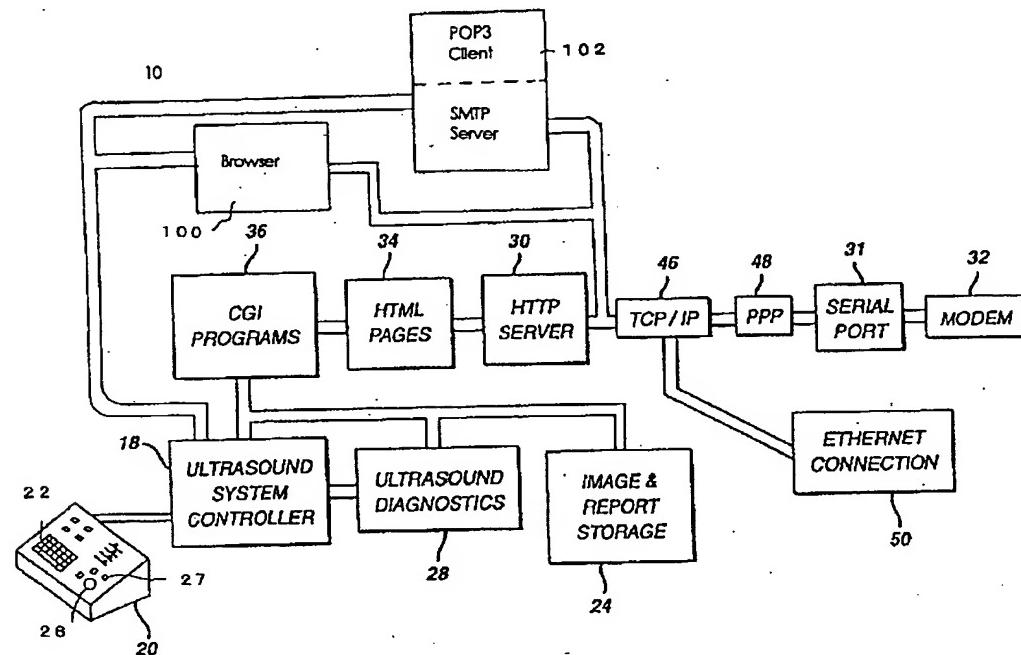
*** NOTICES ***

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

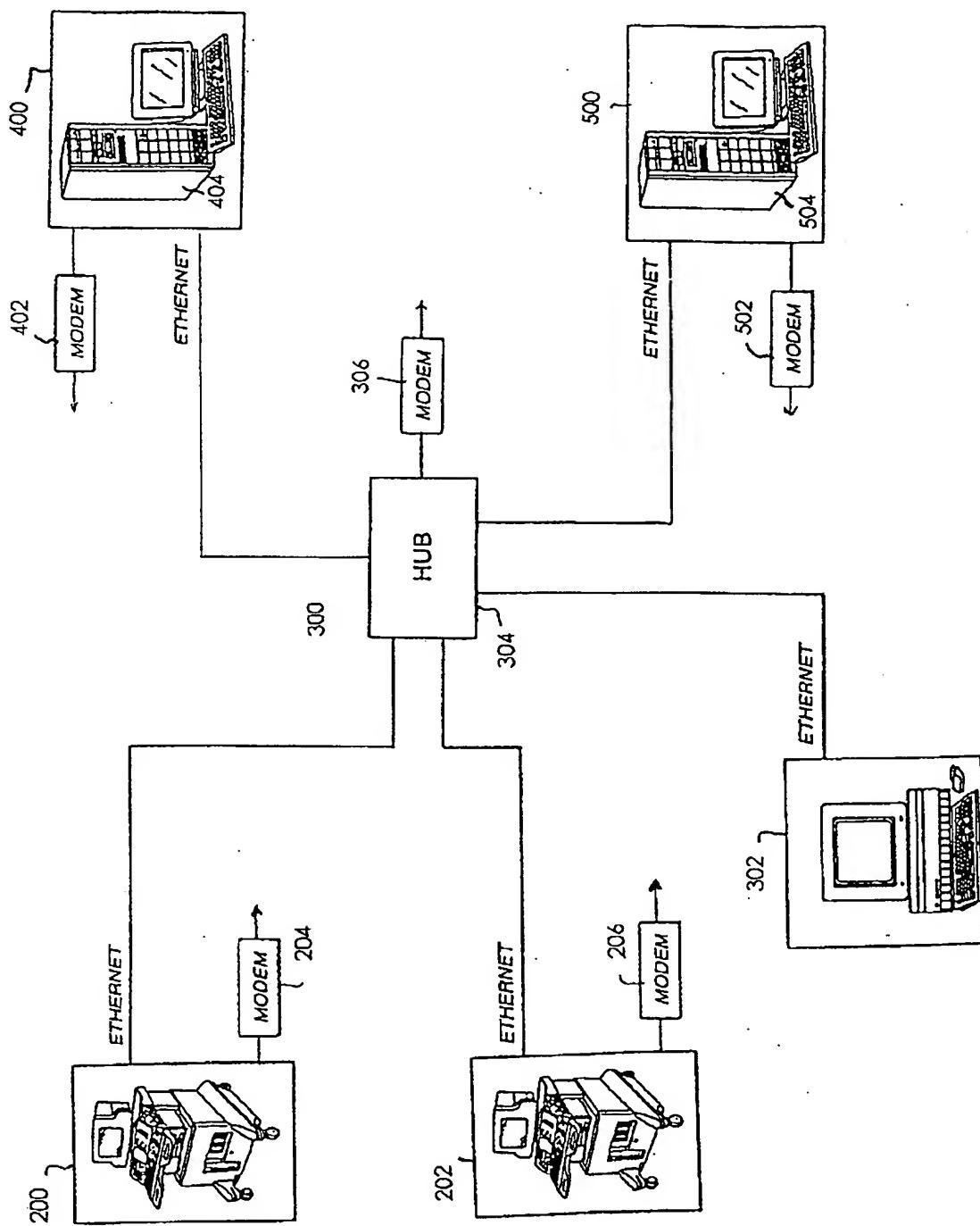
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

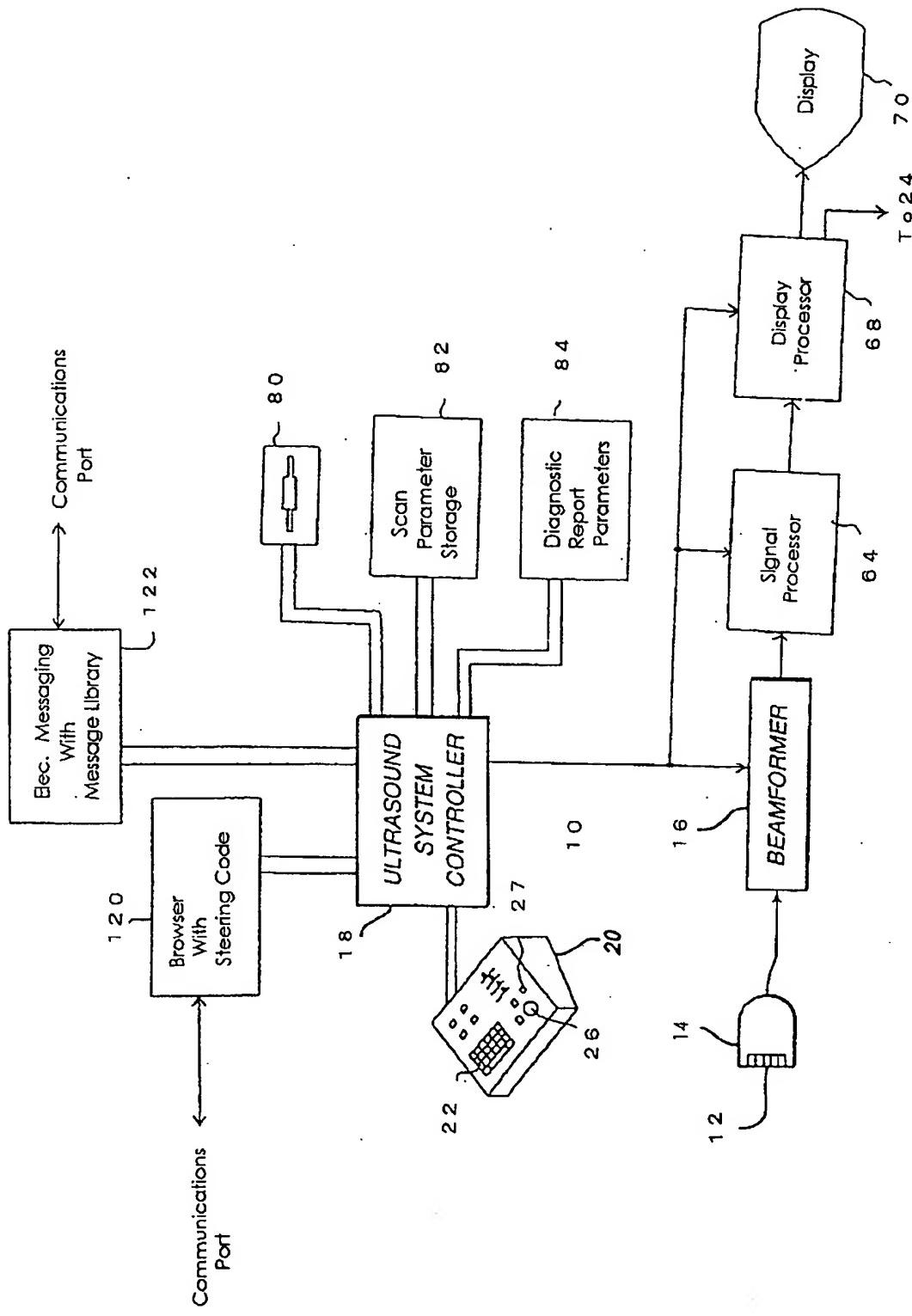
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]